

INTRODUCTION FOR TEACHERS

These resource materials are intended to enhance your students' experience and understanding of The Man Who Discovered That Women Lay Eggs. There is a range of different activities for you to explore in the classroom both before and after the performance.

The resources are primarily aimed at students aged 16+. Please do adapt them to other purposes as you see fit.

COMPANY BACKGROUND

Mixing live performance with unusual puppets, inventive design and evocative music, their work is among the most innovative of the new generation of theatre companies in the south west"

- Bath Chronicle

"Fantastically stunning visual theatre that you need to see."

- BBC Radio Bristol

"this bizarre mix of puppetry, masks and live action does exactly what it says on the tin."

- The Stage



Don't Play With Your Food

Full Beam Visual Theatre is a small touring puppet theatre company based in Bristol in the South West of England. It was set up in 1999 by our Artistic Director Lizzie Philps. After reading drama at Exeter University, Lizzie lived in New Zealand, devising and touring one-woman puppet shows. She is currently Performing Arts Course Leader at Filton College in Bristol. Lizzie has also worked for Volcano Theatre, Them Wifies, Aardman Animations and the BBC. Since forming Full Beam Visual Theatre, she has co-devised, made puppets for and performed in or directed all our shows. The other half of Full Beam is Rachel McNally. She has produced all Full Beam's shows and made bits of puppets for most of them!

In addition, she freelances in marketing and research and has worked for the British Film Commission and The Countryside Agency. From time to time, she gives talks about health & safety in theatre, marketing and touring theatre to students at Filton College.

Full Beam Visual Theatre aims: to re-define puppetry as an art form that can provoke and inspire an adult audience; to create theatre that is new and surprising; to produce theatre that plays to all the senses, that is rich in texture and meaning and has a real sense of fun. Mixing live performance with unusual puppets, inventive design and evocative music, the work ranges from commissioned plays and devised productions to adaptations of classic texts.

The combination of different theatrical media including puppetry, mask and mime underpins Full Beam Visual Theatre's claim to create theatre that is a visual feast and food for thought.

For more information about Full Beam Visual Theatre please go to our website www.fullbeamvisualtheatre.org.uk

BIOLOGY RESOURCES

AQA AS / A2 Biology and Human Biology

This activity can be used to contribute to AQA AS / A2 Biology and Human Biology

Module 4

Coursework

Key Skills

Communication

Objectives:

This resource sheet will encourage students to:

- consider the scientific method;
- scientific report writing;
- drawing from microscopes.

Working in groups, or individually, students should write a scientific report of Von Baer's work up to, and including, his work on humans. The report should consider previous work in the field, Von Baer's hypothesis, research methods, results (including diagrams), and conclusions. Once students have written their report they should examine Von Baer's own report and explore the differences in report writing between Von Baer's time and today.



Von Baer at work

You may wish to run this last exercise as a short discussion: ask the students to work in small groups to discuss the differences for a short time then call the students back to discuss as a whole group. The discussion could cover the influence of religion over science, use of the third person in writing scientific reports and why this is used, types of description etc.

You will need

- A copy of Von Baer's publication or the sections included here
- Light microscope, prepared slides with mammalian ovaries
- Drawing equipment
- Recent editions of a scientific journal such as *Science* or *Nature*

Instructions for the students



Von Baer at his dissection table

Imagine Von Baer's work was being done today. He wishes to publish his findings in a scientific journal such as Science. To do this he needs to submit a report for peer review but this will take time. Von Baer originally published his work in a letter to the Imperial Academy of Sciences of St. Petersburg. Today, for speed some people write a letter to the editor of a journal if they want to publish something quickly or small. What would Von Baer write today if he was writing a letter to the editor?

- Write a letter to the editor of Science describing Von Baer's work and findings. You may want to consider previous work in the field, Von Baer's hypothesis, research methods, results (including diagrams), and conclusions.
- When you have finished your letter to the editor, take a look at Von Baer's original paper describing his work and findings and a recent issue of Science.
- After you have completed your letter to the editor, working in small groups, discuss the following question.
- What are the key differences between current science report writing and Von Baer's report?

Please note: this is very heavily edited version of the original paper by von Baer. The original letter was over 30 pages long.

**On the Genesis of the Ovum of Mammals and of Man
A Letter to the Imperial Academy of Sciences of St. Petersburg
By Karl Ernst von Baer
1827**

Very Distinguished and Illustrious Gentlemen!

I shall make no attempt to express how greatly I have been exalted by your approval of me, which you indicated by electing me as a corresponding member of your Academy. First of all, I, a man of no renown, have been associated with men whose names are of the greatest importance in the republic of letters, and I shall make every effort to follow in the footsteps of those great men. I believe I could not thank you more suitably for your kindness than to share with you a very recent discovery which it gives me the greatest pleasure to present under your auspices, since it pertains to an account of development; for, when the subject of conversation turns to the investigation of nature's formation of new living things - who is unaware of the unparalleled distinction of your Academy!

The origins of the Canine Foetus

Almost immediately after my illustrious colleague Burdach had invited me to make some contribution to the knowledge of mammalian development, I began to devote myself to these investigations, and I was able to observe in the pregnant dog ova very useful for the comparison of their development with the ova of mammals and birds. Indeed, I might almost have worked out the anatomy of this stage of development then, if at the time I had been sufficiently versed in such researches; but because of faulty method I destroyed two of the four ova, and as a result I was then unable to indicate the disposition of the vascular area. I dissected out the still vital uterus of a live dog, a practise which I now strongly oppose; for although you may achieve your purpose by this method in other mammals, yet in the dog the less developed ova are always torn to pieces by the contractions of the uterus, as seems to have happened in the case of those observers who did not discover ova in the mammalian uterus even several weeks after conception (Gottingen gelehrte Anzeigen von Jahre, 1824, p 195). Two hours later I undertook to remove the third ovum from the uterus, which now lacked all vitality. After the horn of the uterus had been very cautiously cut upward, I clearly saw the external membrane of the ovum intact and equipped with numerous villi; but when I laid down the scalpel in order to consider this membrane, the margins of the uterus which had been very closely joined to those villi had retracted, and I saw it had brightly reddish vascular area. Finally in the afternoon I extricated the fourth ovum intact from the uterus, which was now a little flaccid. I spent several hours examining and delineating the membranes and other things, and as a result when I turned to the microscope examination of the vascular area I was no longer able to discern its limits, which I was then compelled to leave in doubt.

[von Baer then goes on to describe the development of the foetus in dogs and rabbits. During these investigations he notices...]

At the opening of the tube in the same uterus I found a very small granule, conspicuous by its whiteness and swimming freely, which under the microscope appeared as a medium-sized, opaque globule with a halo or lucid periphery. What if this little body, although opaque, were an ovum just slipped down from the tube? Or what if the little opaque globule were the vitellus of the future intestinal sac, and the periphery of the cortical membrane?

Impelled by these considerations I undertook to compare ova yet retained in the dog's tubes. This turned out well, for I purchased a dog in which the corpora lutea were open and in which there was no ovum in the uterus; but in the tubes I found little punctiform bodies of whitish-yellow, which exactly resembled the granules just mentioned except that the latter seemed a little larger. I shall now describe this discovery more fully. In the middle was a globule, completely opaque under the microscope, with a surface which was granular rather than smooth and even, for the whole globule was formed of densely packed granules surrounded by a scarcely observable membrane. The globule was surrounded by a narrow, transparent space and a periphery covered by a thin layer of very small granules. After an overnight maceration the greater part of this powder became separated, whereby a continuous and simple membrane came into view. As a result, we recognised the cortical membrane and the internal globule, but I now much regret that I did not attempt to determine by experiments whether or not the globule lacked a cavity; indeed, it seemed solid, but this was refuted by subsequent observation.

Our ova were of remarkable smallness, for those I measured under the microscope were only $\frac{1}{180}$ of an inch in diameter. Nevertheless when they were in view they were readily observed with the naked eye because of their whiteness, but they were very easily concealed by the intervening wrinkles and little folds of the tube. Hence I freely confess that I found only three, although from the number of corpora lutea I expected six. Nonetheless I can only explain the frustrated efforts of many anatomists seeking the ova within the tube by suspicion that they sought transparent ova and thereby neglected the true ones, although I do not know whether or not the ova in the tubes of all mammals are opaque. Up to the present I have not seen the porcine ova in the tubes because of their very small size and I have not sought rabbits' ova in the tubes.

3

Ovules in the Ovary of the Dog

It remained for me to ascertain the condition of the ova in the ovary, for it seemed clearer than light that the ova were not the very small Graafian vesicles expelled from the ovary, nor did I consider it likely that such solid little bodies had been coagulated in the tubes from the fluid of the vesicles. When I examined the ovaries before incising them, I clearly distinguished in almost all the vesicles a whitish-yellow point which was in no way attached to the covering of the vesicle, but as pressure exerted with a probe on the vesicle indicated clearly, swam freely in its liquid. Led on more by inquisitiveness than by hope of seeing the ovules in the ovaries with the naked eye though all the coverings of the Graafian vesicles, I opened a vesicle, of which, as I said, I had raised the top with the edge of the scalpel - so clearly did I see it distinguished from the surrounding mucus - and placed it under the microscope. I was astonished when I saw an ovule, already recognised from the tubes, so plainly that a blind man could scarcely deny it. It is truly remarkable and astonishing that thing so persistently and constantly sought and in all compendia of physiology considered inextricable, could be put before the eyes with such facility.

[von Baer then goes on to describe the detailed physiology of the canine ovule.]

4

How the Graafian Vesicles Are Constructed, and General Considerations of the Mammalian Ovule

In the dog the Graafian vesicles are too small to be examined with success, but I have often investigated them in pugs and, I believe, very accurately. I have compared the vesicles of cows, sheep, dogs, rabbits, the stag, porpoise and dolphin, as well of man, with them, and I have persuaded myself that in all these animals the structure is the same, although in the smaller animals it happens that not all strata are so well separated as in the pig, cow and dolphin.

[Section 5 describes a review of the development of the mammalian foetus, including dissections of pregnant women]

6

Comparison the Mammalian Ovule with the Ova of other Animals

[following a lengthy description of the ova of many other animals]

Therefore when we consider the ova and generally the maternal body, the Graafian vesicle is the mammalian ovum. But as to its development, it differs greatly from the ovum of other animals in which the nucleus of the ovum is carried down from the ovary as a whole, not only providing a site for the future foetus but also transforming itself into the foetus.

Conclusions

Every animal which springs from the coition of male and female is developed from an ovum, and none from a simple, formative liquid.

The male semen acts through the membrane of the ovum, which is pervious by no foramen, and in the ovum it acts first on certain innate parts of the ovum.

DESIGN & TECHNOLOGY RESOURCES

AS / A2 Design and Technology

Please also look at the "Design Discussion Points", which considers the artistic/theatrical element of the design process.

AQA Design and Technology AS / A2 links

This activity can be used towards the following sections of AQA Design and Technology

AS

A. Materials and Components

Classification of Materials

Working Properties

B. Design and Market Influences

Design in Practice

Design in the Human Context

c. Processes and Manufacture

Product Manufacturing

A2

B. Design and Market Influences

Development of D&T

Design in Practice

Design in the Human Context

The activity is also relevant for much of the Key Skills Qualification

Objectives:

This resource sheet will encourage students to work on a design and technology project in a real-world situation.

Students should work on designing and prototyping mechanisms for puppet movement. They should also be prepared to communicate their ideas to the puppeteers who will be using the puppets whilst on tour.

You will need:

- CAD / Drawing equipment
- Web access / footage of Alice included on DVD
- Illustrations of actual mechanisms
- Materials for prototyping
- Powerpoint / OHP or other presentation aids

Running the activities

This resource sheet has been devised with the intention of it running over a number of teaching sessions. For example:

- Session 1: research and initial design
- Session 2: devising prototypes
- Session 3: presenting ideas

However, you may wish to shorten the activities into one teaching session by using the brief as a source for discussion with the students working either as a whole group or in smaller groups.

Please remember that Full Beam Visual Theatre will not be available for the students' presentations, you will have to stand in for them!



Von Baer & Aristotle

Instructions for students

Full Beam Visual Theatre are in need of some new puppets for their next tour. The production they are going to tour is popular and it is going to be a busy schedule, there will be little time for mending broken puppets.

You have been invited to design and prototype mechanisms for the new puppets.

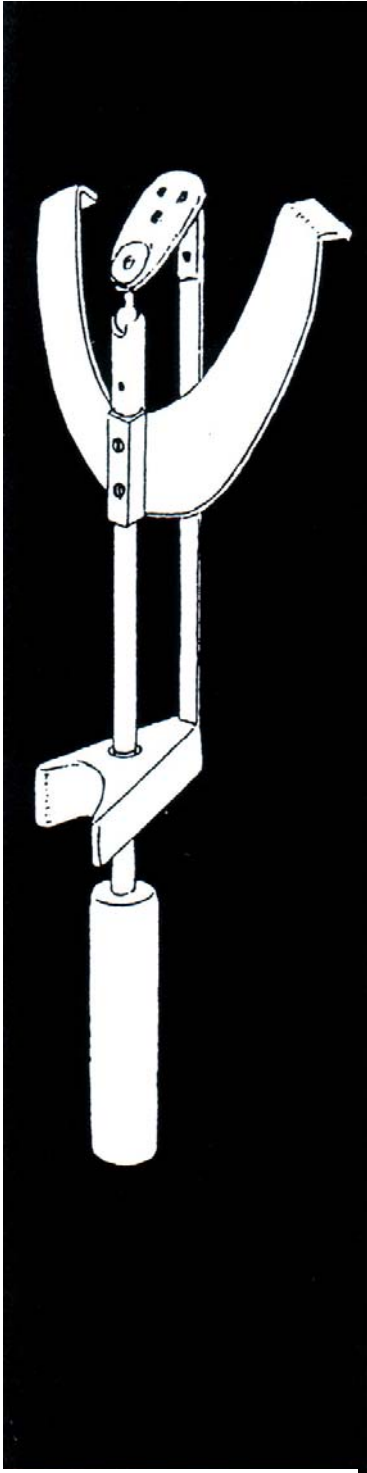
Full Beam Visual Theatre have provided some factors you need to consider:

- The puppets must be able to move their mouth, head and hands independently, and appear to pick up an object with their right hand;
- There is only one operator, who may need to switch between left and right hands;
- The puppets are table-top i.e. no more than $\frac{1}{2}$ m high, they will be operated on table tops approximately 0.9m high;
- The puppets must be robust, but easily repairable if they do break;
- Money is short for this small company the usual budget for materials per puppet is no more than £10.00.

Your task:

- Do some research: e.g. look at the short video clip of Alice (available on Full Beam's website). You may wish to look at other puppet mechanisms (please see below) to get some inspirations for your designs.
- Design and prototype your mechanism(s).
- Give a presentation of your ideas to your peers and the Company showing how you have taken their instructions into consideration including any novel features you have created that will meet the company's needs.
- Your presentation should be no more than 10 minutes long.

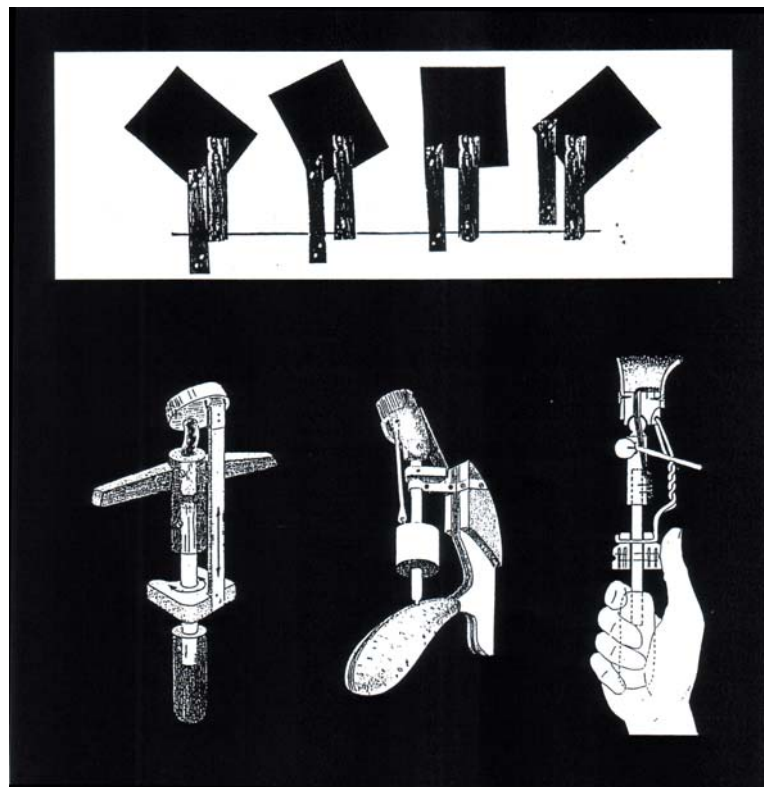
Turning Nodding Mechanism



Design by Günter Schnorr

“The principle of use a jointed parallelogram to incline a puppet’s head is fairly common...Basically the head is secured with a flexible joint to the top of a short rod, and another rod is attached to the base of the head, also with a joint. When the second rod is pushed upwards, the head inclines forwards...”

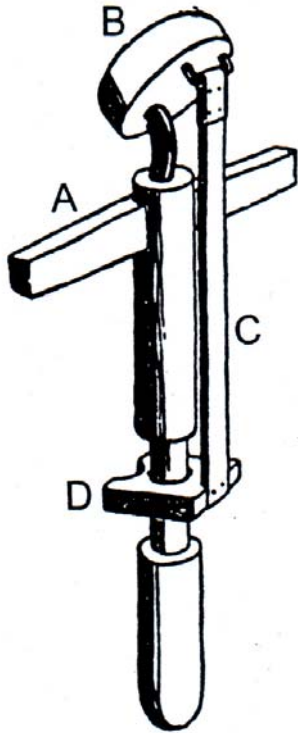
The first row of diagrams below shows how a parallelogram can be used to generate movement. Keeping the right stick stationary, the left stick is pushed up, which affects the position of the black square. The second row shows three different mechanisms that use this same principle to control a puppet’s head.”



Designs and text pp152-153 HJ Fettig, *Rod Puppets & Table-Top Puppets: A handbook of design and technique*, DaSilva Puppet Books, 1997

Turning Nodding Mechanism by A J Fedotov

"The turning-nodding mechanism described by Fedotov in his book *Technik des Puppentheaters** is as follows:

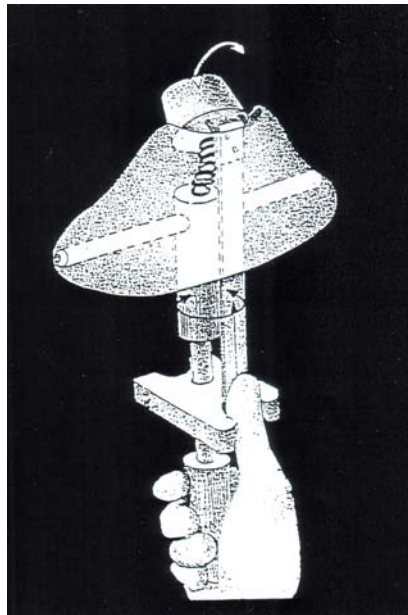


"The mechanism consists of three parts; a rigid rod connected to the shoulder piece (a), a movable rod (b), which causes the head to turn and nod and a wooden disk (c) onto which the head is attached. The rod (b) is fixed to a control plate (d), which turns freely around the rigid rod. When the performer rotates the ring with the thumb, the puppet turns its head. If the control plate is pulled down, the puppet nods.

The puppet's head is connected by a loop to the rod that controls the head movements, and to the rigid rod by a flexible support. This could be a piece of wire or a tough piece of rubber tubing."
...By making two hollows in the control plate (see diagram below) it is possible to manipulate the puppet from the front of the back. The example uses a spring to the head plate instead of rubber tubing.

*First published in Russia 1953; translated and published in Germany 1956

Turning-nodding mechanism in Fedotov's book



Turning-nodding mechanism with spring

Designs and text pp154-155 HJ Fettig, *Rod Puppets & Table-Top Puppets: A handbook of design and technique*. DaSilva Puppet Books. 1997

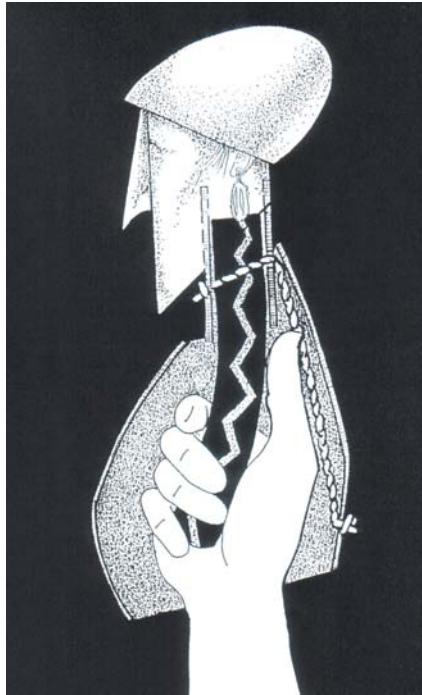
Rolf Trexler's "Knotted-String" Mechanism



One of the simplest mechanisms to control a rod puppet is... "Trexler's Knotted-String"...

The head and body of the puppet below are joined by a length of garden hose and a piece of string: a simple mechanism which allows the head and shoulders to be moved separately. The garden hose is inserted in the puppet's neck, which gives it some flexibility. The head can be rotated (using the wrist) or inclined (using the thumb to bend the hose), whilst the shoulders hang free. Alternatively, the head is held in a fixed position whilst the thumb rotates the shoulders by manipulating the string. The measurements of the flexibility of the various elements can be coordinated so that the thumb is also able to manipulate the puppet's chest, as shown left.

The construction of the mechanism is very easy. As can be seen from the diagram below, the string passes through the neck (and hose) down to the lowest possible point in the puppet's back/shoulders, where it is fixed with a knot.



Designs and text pp172-73 Hj Fettig, *Rod Puppets & Table-Top Puppets: A handbook of design and technique*. DaSilva Puppet Books. 1997

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